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ENVIRONMENTAL SERVICES • 1333 BROADWAY, SUITE 330A • OAKLAND, CALIFORNIA 94612

Public Works Agency

(510) 238-6688
FAX (510) 238-7286
TDD (510) 238-7644

May 27, 1998

3978

Mr. Barney Chan
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Subject: **Groundwater Monitoring Report – February 1998, City of Oakland Municipal Service Center (94407)**

Dear Mr. Chan:

Enclosed is one copy of the Groundwater Monitoring Report for February 1998, prepared by our consultant, DOVE Engineering Group, Inc., for the City of Oakland's Municipal Service Center at 7101 Edgewater Drive. Groundwater monitoring will be performed again this month in accordance with the quarterly monitoring schedule.

Please call me at 238-7695, if you have any questions or require additional information.

Sincerely,

Mark B. Hersh
Environmental Program Specialist

cc: (w enclosure)
Dianne Heinz, Port of Oakland

(w/o enclosure)
Andrew Clark-Clough
Chris Palmer, DOVE

June 8, 1998

Memo to file:

On Friday, June 5, 1998, Mark Hersh of the City of Oakland Public Works, called regarding the future removal of the approximately 2000 linear feet of piping at the City of Oakland MSC on Edgewater Drive. He was questioning about ways to limit the amount of sampling and analysis and the ways to reduce soil disposal costs during this excavation. I agreed to accept one soil sample per every 40 lineal feet. He offered to screen soil as opposed to running them by chemical analysis. I discussed options with Madhulla and she suggests stockpiling the soil, aerating and sampling composites. I left this message with Mark, this morning.

Barney

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ENVIRONMENTAL
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QUARTERLY GROUNDWATER MONITORING REPORT
FEBRUARY 1998

Municipal Service Center
7101 Edgewater Drive
Oakland, California

ACC Project No. 97-6442-001.00

Prepared for:

City of Oakland
Public Works Agency/Environmental Services Division
Oakland, California 94612

May 7, 1998

Prepared by: Carolyn Mulvihill

Carolyn Mulvihill
Technical Editor

Reviewed by: David R. DeMent

David R. DeMent, RG
Senior Geologist, ACC

REGISTERED GEOLOGIST
DAVID R. [redacted]
NO. [redacted]
STATE OF CALIFORNIA

7977 Capwell Drive, Suite 100 • Oakland, CA 94621 • (510) 638-8400 • FAX: (510) 638-8404
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GROUNDWATER MONITORING REPORT
Municipal Service Center
7101 Edgewater Drive
Oakland, California

1.0 INTRODUCTION

ACC Environmental Consultants, Inc., (ACC) was retained by Dove Engineering Group, Inc., (DEGI) to conduct groundwater monitoring of the 10 monitoring wells at the Municipal Service Center (MSC), Oakland, California (Figure 1). Eight wells are located onsite and two wells are located adjacent to the MSC, east across Edgewater Drive.

The project objectives were to: measure the water levels and calculate the elevation of the groundwater in the wells; obtain groundwater samples from the eight onsite wells and analyze the water samples for various analytes; and report the findings.

2.0 BACKGROUND

The MSC is located at 7101 Edgewater Drive and occupies approximately 17 acres adjacent to San Leandro Bay and Damon Slough (Figure 2). The site is used by various City of Oakland departments for vehicle and equipment storage, maintenance, and fueling. The MSC property consists of offices including the Public Works building and warehouse structures used for maintenance. Fourteen underground storage tanks (USTs) were previously located at the site and an abandoned pressurized underground gasoline pipeline network is currently located at the site. Previous site investigation indicates that reportable levels of fuel hydrocarbons are present in the soil and groundwater.

3.0 GROUNDWATER MONITORING AND SAMPLING

ACC performed groundwater monitoring and sampling of wells MW-1, MW-2, and MW-5 through MW-10 on February 23 and 24, 1998. Work at the site included measuring depth to water, subjectively evaluating groundwater in the wells for petroleum hydrocarbon odor and sheen, and purging and sampling the wells for laboratory analysis. Sampling was performed according to the formerly approved sampling protocol for the site and according to the sampling schedule in the Dove Engineering Workplan dated January 20, 1998. Sampling results have been reviewed by Mr. Christopher Palmer, project manager for DEGI.

Before groundwater sampling, the depth to the surface of the water was measured from the top of the polyvinyl chloride well casing using a Solinst water level meter. All water level measurements were collected in an approximate 50 minute period to minimize potential tidal influences on February 23, 1998, and were recorded to the nearest 0.01 foot. Groundwater monitoring data was recorded on the attached well monitoring worksheets. Information regarding groundwater levels is summarized in Table 1.

TABLE 1 - GROUNDWATER DEPTH INFORMATION

Well No.	Date Sampled	Well Elevation[1] (above MSL)	Depth to Groundwater	Groundwater Elevation
MW-1	11/20/97	10.20	6.41	3.79
	02/24/98		1.75	8.45
MW-2	11/20/97	10.47	7.67	2.80
	02/24/98		5.44	5.03
MW-3[2]	11/20/97	---	6.93	---
	02/24/98		---	---
MW-4[2]	11/20/97	7.89	6.59	1.30
	02/24/98		---	---
MW-5	11/20/97	11.15	6.45	4.70
	02/24/98		4.22	6.93
MW-6	11/20/97	10.98	8.91	2.07
	02/24/98		6.00	4.98
MW-7	11/20/97	11.51	7.24	4.27
	02/24/98		4.69	6.82
MW-8	11/20/97	12.22	9.59	2.63
	02/24/98		8.42	3.80
MW-9	11/20/97	10.77	7.91	2.86
	02/24/98		6.11	4.66
MW-10	11/20/97	10.59	7.70	2.89
	02/24/98		4.39	6.20

Notes: *All measurements in feet*
[1] Well elevation measured to top of casing
[2] Well submerged at time of survey

After water level measurements were collected, wells MW-1, MW-2, MW-5, and MW-7 through MW-10 were purged by hand using a designated disposable polyethylene bailer for each well. Well MW-6 was not purged or sampled due to the presence of free-phase floating product (free product). Groundwater pH, temperature, salinity, dissolved oxygen, turbidity, and electrical conductivity were monitored during well purging. Each well was properly purged by the removal of four well volumes. Worksheets of conditions monitored during purging are attached.

After the groundwater level had recovered to a minimum of approximately 80 percent of its static level, water samples were obtained using designated disposable polyethylene bailers and laboratory supplied containers. The samples were preserved in a pre-chilled insulated container and submitted to Chromalab, Inc., (Chromalab) following chain of custody protocol.

3.1 Groundwater Gradient

Groundwater elevations were calculated from data collected from the wells on February 23, 1998. The gradient was evaluated by triangulation using the elevation of the potentiometric surface measured with respect to mean sea level datum. As shown in Figure 3, general groundwater flow direction is north at a gradient of 0.020 foot/foot in the northern portion of the site and southwesterly at a gradient of 0.007 foot/foot in the southern portion of the site. Groundwater flow direction is summarized in Table 2.

TABLE 2 - GROUNDWATER GRADIENT AND FLOW DIRECTION

Date Monitored	Gradient (foot/foot)	Direction
11-20-97 (north)	0.005	North
11-20-97 (south)	0.004	Southwest
02-23-98 (north)	0.020	North
02-23-98 (south)	0.007	Southwest

3.2 Groundwater Analytical Results

One groundwater sample from each of wells MW-1, MW-2, MW-5, and MW-7 through MW-10 was collected and submitted to Chromalab for analysis. Selected samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method SW846 8020A Nov 1990/8015 Mod, total extractable petroleum hydrocarbons (TEPH) as kerosene, diesel, and motor oil by EPA Method 8015M, purgeable aromatics by EPA Method SW846 8020A Nov 1990, lead and nickel by EPA Method 3010A/3050A/6010A Nov 1990, and fuel oxygenates [methyl-tertiary-butyl ether (MTBE), di-isopropyl ether (DIPE), tertiary butyl alcohol (TBA), ethyl-tertiary-butyl ether (ETBE), and tertiary amyl methyl ether (TAME)] by GC/MS EPA SW846 Method 8260 Modified. Samples were treated with silica gel cleanup by EPA Method 3630M to remove any naturally occurring hydrocarbons from the samples.

Reportable concentrations of fuel oxygenates were not detected in wells MW-8 through MW-10. The sample from well MW-2 indicated a concentration of 0.16 mg/L of lead. The sample from well MW-7 indicated a concentration of 0.032 mg/L of nickel. The remainder of the analytical results of the groundwater samples are summarized in Table 3. A copy of the analytical results and chain of custody record is attached.

TABLE 3 – GROUNDWATER SAMPLE ANALYTICAL RESULTS

Well Date	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	TPHd (µg/L)	TEPH[1] (µg/L)
MW-1							
10/04/89	540	120	46	43	78	---	---
04/27/93	<1000	<1	<1	<1	<1	---	---
04/19/95	3,200	880	15	23	21	---	---
07/27/95	980	130	3.6	1.4	5.6	---	---
11/20/95	400	99	2.8	1.1	4.6	---	---
02/21/96	1,700	340	8.4	5.3	16	---	---
05/13/96	7,300	2,000	30	42	38	---	---
08/87/96	380	61	2.4	<0.5	4.2	---	---
11/20/97	---	---	---	---	---	---	---
02/23/98	820	160	4.9	3.0	9.7	---	<RL[3]
MW-2							---
10/04/89	<30	2	<2	<2	<2	---	---
04/27/93	<1,000	<1	<1	<1	<1	---	---
04/19/95	<50	1.8	<0.5	<0.5	<0.5	---	---
07/27/95	<50	2.3	<0.5	<0.5	<0.5	---	---
11/20/95	<50	2.2	<0.5	<0.5	<0.5	---	---
02/21/96	<50	1.7	<0.5	<0.5	<0.5	---	---
05/13/96	---	2	<0.5	<0.5	<0.5	---	---
08/27/96	---	2.4	<0.5	<0.5	<0.5	---	---
11/20/96	---					---	---
11/20/97	---					---	---
02/24/98	---	1.6	<0.5	<0.5	<0.5	---	<RL[3]
MW-5							
12/31/91	16,000	1,800	<250	1,000	3,800	1,900	---
04/27/93	35,000	2,100	<1.0	1,800	2,700	12,000	---
04/19/95	14,000	490	51	610	1,200	880	---
07/27/95	22,000	1,300	54	1,500	2,400	590	---
11/20/95	8,900	430	31	610	880	<50	1,900
02/21/96	10,000	540	65	700	970	480	<50
05/13/96	7,300	360	22	490	640	<50	<50
08/27/96	6,300	410	25	580	620	660	<50
11/20/96	---	---	---	---	---	---	---
11/20/97	---	---	---	---	---	---	---
02/23/98	740	19	1.4	41	34	---	<RL[3]
MW-6							
12/31/91	780	110	2.7	<2.5	5.5	520	---
04/27/93	<1000	430	4	5	10	<1,000	---
04/19/95	5,700	40	<0.5	3.9	29	6,700	---
07/27/95	6,100	430	15	200	600	3,900	---
11/20/95	3,600	130	11	4.4	200	830	---
02/21/96	2,800	230	2.8	3.8	44	1,700	---
05/13/96	3,100	430	12	5.2	67	400	<RL[3]
08/27/96	4,200	300	9.3	110	110	3,100	---
11/20/96	---	---	---	---	---	---	---
11/20/97	---	---	---	---	---	---	---
02/24/98[4]	FP	---	---	---	---	---	---

Well Date	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	TPHd (µg/L)	TEPH[1] (µg/L)
MW-7							
12/31/91	<50	<0.5	<0.5	<0.5	<0.5	<50	---
04/27/93	<1,000	<1	<1	<1	<1	<1,000	---
04/19/95	<50	<2	<2	<2	<2	<50	---
07/27/95	<50	<2	<2	<2	<2	<50	---
11/20/95	<50	<0.5	<0.5	<0.5	1.5	<50	---
02/21/96	<50	<0.5	<0.5	<0.5	<0.5	<50	---
05/13/96	---	<0.5	<0.5	<0.5	<0.5	---	---
08/27/96	---	<0.5	<0.5	<0.5	<0.5	---	---
11/20/96	---	---	---	---	---	---	---
11/20/97	---	---	---	---	---	---	---
02/24/98	---	---	---	---	---	---	---
MW-8							
11/20/96	<50	0.66	<0.5	<0.5	<0.5	880	200d
11/20/97	<50	<0.5	<0.5	<0.5	<0.5	---	--
02/24/98	<50	<0.5	<0.5	<0.5	<0.5	---	<RL[3]
MW-9							
11/20/96	240	21	0.81	1.8	2.2	1,900	1000d[2],
11/20/97	300	20	<0.5	<0.5	1.8	---	780m
02/24/98	2,200	540	5.6	1.6	4.9	---	<RL[3]
MW-10							
11/28/96	<50	49	0.59	0.54	1.2	940	370d[2],
11/20/97	<50	<0.5	<0.5	<0.5	<0.5	---	570m
02/24/98	<50	<0.5	<0.5	<0.5	<0.5	---	<RL[3]

Notes: *[1]TEPH as diesel (d), motor oil (m), and kerosene (k)*
[2]Hydrocarbon reported is in the late diesel range and does not match the laboratory's diesel standard
[3]The reporting limit (RL) for diesel is 50 ppb, motor oil is 500 ppb, and kerosene is 50 ppb
[4]Well not sampled due to the presence of free-phase floating product

4.0 DISCUSSION

Groundwater sample analytical results indicate minor concentrations of gasoline constituents in wells MW-1 and MW-5, and increased concentrations in well MW-9. Free product was observed in well MW-6 at a thickness of 0.125 inch and the well was not sampled.

Groundwater gradient and flow direction varies across the site. These variations appear to be due to the complex hydrogeology at the site and the presence of buried former stream channels related to reclamation of the former wetlands.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on analytical results and field observations and measurements, ACC has made the following conclusions regarding shallow groundwater at the site.

- Concentrations of gasoline constituents were detected in wells MW-1, MW-5, and MW-9, and free product was observed in well MW-6;

- Metal concentrations in wells MW-2 and MW-7 appear to be indicative of naturally occurring geologic conditions;

- Dissolved oxygen (DO) levels vary across the site from 0.2 to 5.0 ppm and were generally lower (< 1 ppm) in wells MW-1, MW-2, and MW-9; decreased DO levels may be the result of oxygen consumption during microbial degradation of petroleum hydrocarbons, or increased biological or chemical oxygen demand; and

- Groundwater flow direction differs across the site and may be controlled by preferential groundwater movement related to former, buried stream channels. Flow direction and gradient are fairly consistent with previous groundwater monitoring events.

Based on the results of groundwater monitoring and sampling, DEGI and ACC recommend:

- Conducting future sampling events biannually in wells MW-8 through MW-10 to document groundwater conditions and concentrations of constituents of concern;

- Evaluating groundwater analytical results obtained to date and modifying the current groundwater sampling and analysis schedule as appropriate; and

- Continuing operation of the interim groundwater/product recovery system installed at the location of former USTs designated 1, 2, and 3. Groundwater is currently extracted from the former UST excavation, treated with activated carbon, and discharged to an existing stormdrain under permit. The system became operational in March 1998 and will be more thoroughly described in the May 1998 Quarterly Groundwater Monitoring Report.

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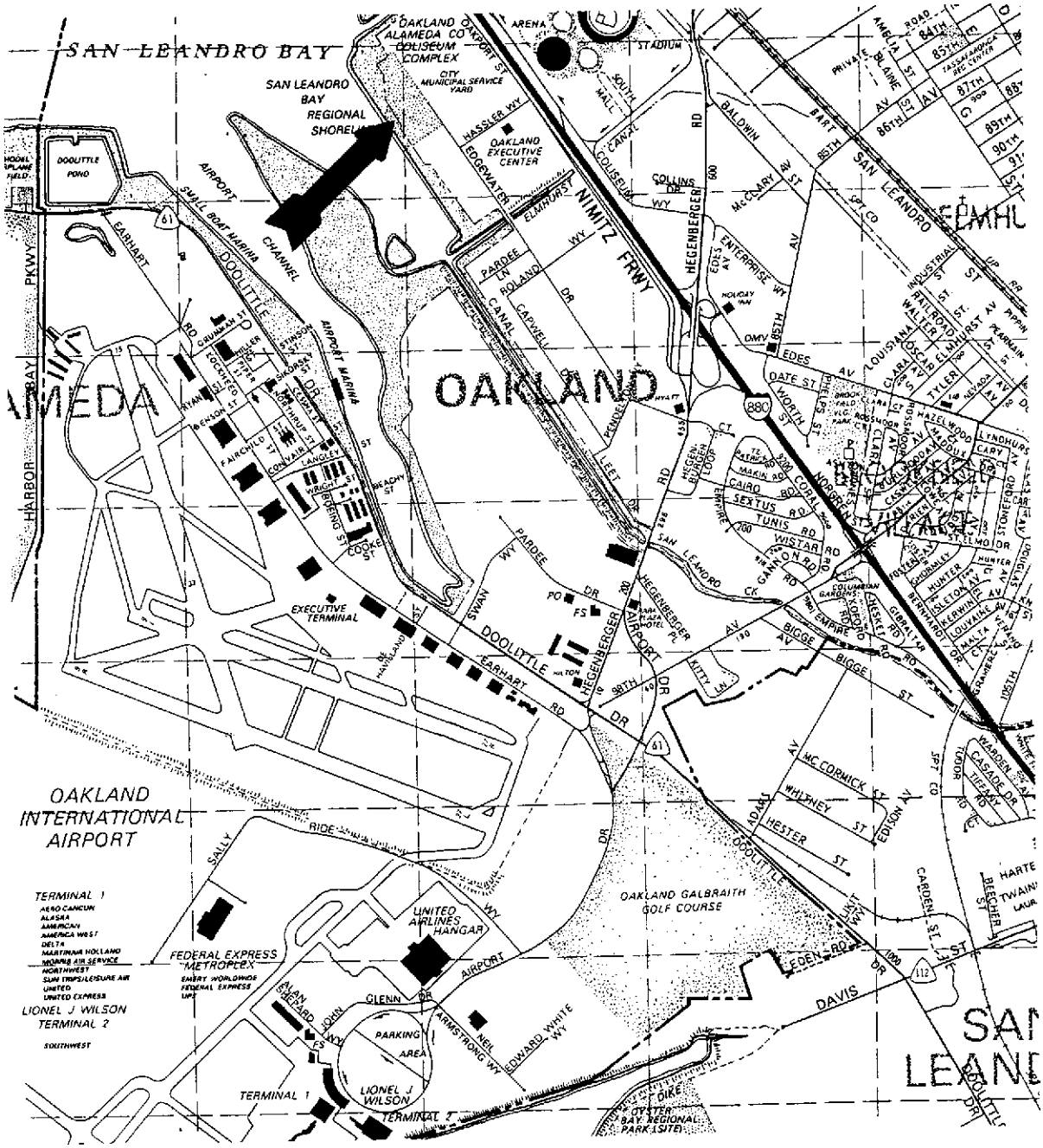
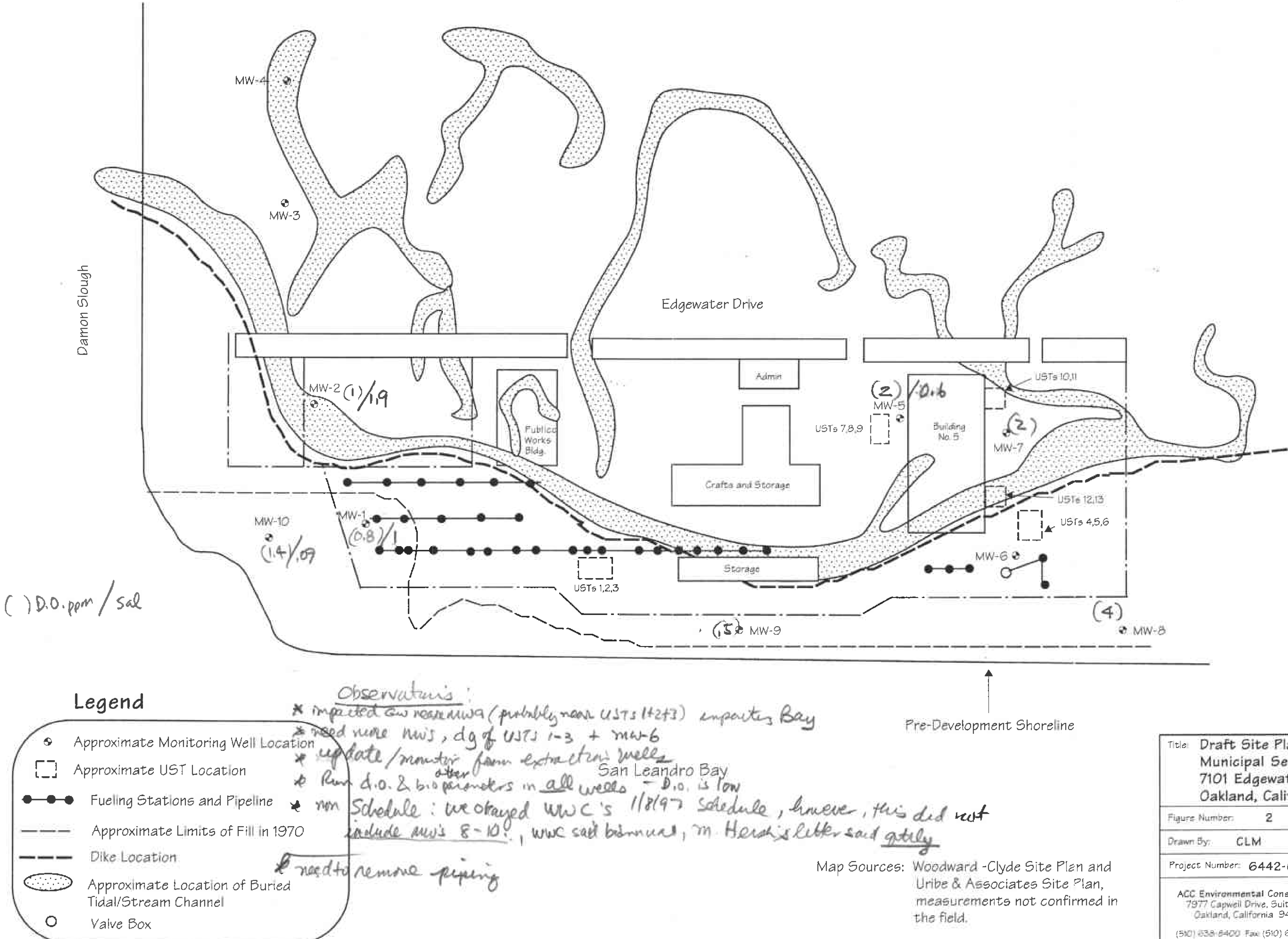
Report recommends biannually.



Title: Location Map Municipal Service Center 7101 Edgewater Drive Oakland, California	
Figure Number: 1	Scale: 1" = 1/4 mi
Drawn By: CLM	Date: 1/22/98
Project Number: 97-6442-001.00	N / W E / S
ACC Environmental Consultants 7977 Capwell Drive, Suite 100 Oakland, California 94621 (510) 638-8400 Fax: (510) 638-8404	

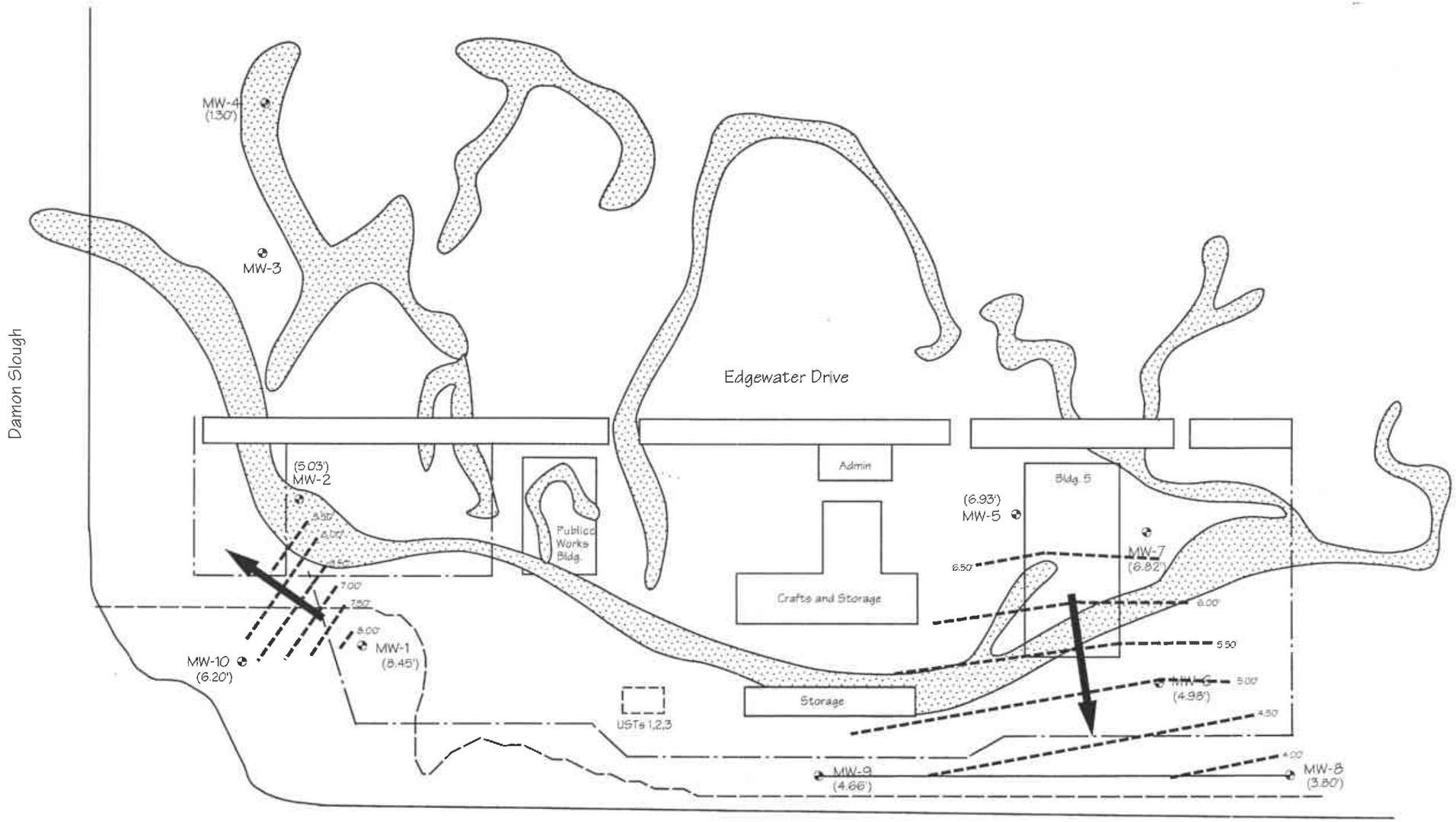
SOURCE: Thomas Bros. Guide, 1994



Damon Slough
MW-4
MW-3
Edgewater Drive
MW-2
Public Works Bldg.
Admin
Crafts and Storage
MW-5
USTs 7,8,9
Building No. 5
USTs 10,11
MW-7
USTs 12,13
USTs 4,5,6
MW-10
MW-1
MW-6
Storage
USTs 1,2,3
MW-9
MW-8
Pre-Development Shoreline
San Leandro Bay
Legend
Approximate Monitoring Well Location
Approximate UST Location
Fueling Stations and Pipeline
Approximate Limits of Fill in 1970
Dike Location
Approximate Location of Buried Tidal/Stream Channel
Valve Box
Map Sources: Woodward -Clyde Site Plan and Uribe & Associates Site Plan, measurements not confirmed in the field.

Title:	Draft Site Plan Municipal Service Center 7101 Edgewater Drive Oakland, California
Figure Number: 2	Scale: 1 in = 200 ft
Drawn By: CLM	Date: 12/16/97
Project Number: 6442-001.00	

ACC Environmental Consultants
7977 Capwell Drive, Suite 100
Oakland, California 94621
(510) 638-8400 Fax: (510) 638-8404



Legend

- Approximate Monitoring Well Location
- Approximate Limits of Fill in 1970
- Approximate Location of Buried Tidal/Stream Channel
- Approximate Groundwater Contour Elevation (contour interval = 0.25 feet)
- Approximate Groundwater Flow Direction

Groundwater Depths Measured February 23, 1998

Map Source: Woodward -Clyde Site Plan and Uribe & Associates Site Plan, measurements not confirmed in the field. Well elevations provided by Oakland Public Works.

Title: **Gradient Map**
Municipal Service Center
7101 Edgewater Drive
Oakland, California

Figure Number: 3	Scale: 1 in = 200 ft
Drawn By: CLM/DRD	Date: 3/25/98
Project Number: 6442-001.00	

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Oakland, California 94621
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ACC MONITORING WELL WORKSHEET

JOB NAME:	PURGE METHOD: Manual Bailing
SITE ADDRESS: 7101 Edgewater Dr.	SAMPLED BY: Eloy Lisneros
JOB #: (95807) 6442-1.0	LABORATORY: Chromalab
DATE: 2/23/98 & 2/24/98	ANALYSIS: ~~TPH~~g, BTEX, TEPH, Oxygenates, Luft Metals
Onsite Drum Inventory SOIL: 3 partially full	MONITORING ☒ DEVELOPING ☐
EMPTY: 2 WATER: 3=100% 1=30%	SAMPLING ☒

WELL: MW-1

DEPTH OF BORING: 15.57'
DEPTH TO WATER: 1.75'
WATER COLUMN: 13.82'
WELL DIAMETER: 2"
WELL VOLUME: ≈2.3gal
COMMENTS:

PURGE VOL. (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.
2.3	7.16	16.2	11.5	0.65	983	0.8
4.6	7.13	16.9	13.6	0.78	999	0.8
6.9	7.11	17.2	17.3	1.03	999	0.9
9.2	7.10	17.3	17.5	1.02	999	0.7

OBSERVATIONS: ☐ Froth ☐ Sheen ☐ Odor Type_____ ☐ Free Product Amount_____Type_____ ☐ Other

WELL: MW-2

DEPTH OF BORING: 15.44'
DEPTH TO WATER: 5.44'
WATER COLUMN: 10.00'
WELL DIAMETER: 2"
WELL VOLUME: ≈1.6gal
COMMENTS:

PURGE VOL. (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.
1.6	7.05	16.6	31.6	1.94	999	1.3
3.2	6.99	17.0	31.1	1.93	999	0.8
4.8	6.98	17.3	30.9	1.93	999	1.1
6.4	6.99	17.5	30.7	1.93	999	1.0

OBSERVATIONS: ☐ Froth ☐ Sheen ☐ Odor Type_____ ☐ Free Product Amount_____Type_____ ☐ Other

WELL: MW-5

DEPTH OF BORING: 14.19'
DEPTH TO WATER: 4.22'
WATER COLUMN: 9.97'
WELL DIAMETER: 2"
WELL VOLUME: ≈1.6gal
COMMENTS:

PURGE VOL. (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.
1.6	6.95	16.1	9.7	0.54	95	2.0
3.2	6.92	16.5	11.1	0.61	147	2.1
4.8	6.93	16.7	10.9	0.60	152	2.1
6.4	6.92	16.7	10.8	0.60	183	1.9

OBSERVATIONS: ☐ Froth ☐ Sheen ☒ Odor Type gas ☐ Free Product Amount_____Type_____ ☐ Other

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ACC MONITORING WELL WORKSHEET

JOB NAME:	PURGE METHOD: Manual Bailing
SITE ADDRESS: 7101 Edgewater Dr.	SAMPLED BY: Eloy Cisneros
JOB #: (95807) 6442-1.0	LABORATORY: Chromalab
DATE: 2/23/98 & 2/24/98	ANALYSIS: TPHg, BTEX, LUFT METALS, TEPH, Oxygenate
Onsite Drum Inventory SOIL: 3 partially full	MONITORING ☒ DEVELOPING ☐
EMPTY: 2 WATER: 3=100% 1=30%	SAMPLING ☒

WELL: MW-6

DEPTH OF BORING: 14.08'
DEPTH TO WATER: 6.00'
WATER COLUMN: 8.08'
WELL DIAMETER: 2"
WELL VOLUME:
COMMENTS: Did not sample due to presence of free product.

PURGE VOL (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.

OBSERVATIONS
☐ Froth
☐ Sheen
☐ Odor Type_____
☒ Free Product
Amount ≈1/8" Type gas
☐ Other

WELL: MW-7

DEPTH OF BORING: 14.62'
DEPTH TO WATER: 4.69'
WATER COLUMN: 9.93'
WELL DIAMETER: 2"
WELL VOLUME: ≈1.6gal
COMMENTS:

PURGE VOL (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.
1.6	7.21	16.1	12.1	0.60	58	2.5
3.2	6.98	16.2	11.0	0.56	81	2.1
4.8	7.01	16.3	10.7	0.56	102	2.1
6.4	7.01	16.3	10.8	0.58	94	2.0

OBSERVATIONS
☐ Froth
☐ Sheen
☐ Odor Type_____
☐ Free Product
Amount_____Type_____
☐ Other

WELL: MW-8

DEPTH OF BORING: 15.09'
DEPTH TO WATER: 8.42'
WATER COLUMN: 6.67'
WELL DIAMETER: 2"
WELL VOLUME:
COMMENTS:

PURGE VOL (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.
	7.81	15.4	9.3	0.51	260	4.1
	7.70	15.6	11.1	0.63	511	5.0
	7.63	15.8	15.1	0.88	981	4.0
	7.62	15.9	15.3	0.89	954	3.8

OBSERVATIONS
☐ Froth
☐ Sheen
☐ Odor Type_____
☐ Free Product
Amount_____Type_____
☐ Other

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ACC MONITORING WELL WORKSHEET

JOB NAME:	PURGE METHOD: Manual Bailing
SITE ADDRESS: 7101 Edgewater Drive	SAMPLED BY: E. Cisneros
JOB #: (95807) 6442-1.0	LABORATORY: Chromalab
DATE: 2/23/98 & 2/24/98	ANALYSIS: TPHg, BTEX, TEPH, Oxygenates, LUFT Metals
Onsite Drum Inventory SOIL: 3 partially full	MONITORING ☒ DEVELOPING ☐
EMPTY: 2 WATER: 3=100% 1=30%	SAMPLING ☒

WELL: MW-9
DEPTH OF BORING: 14.79'
DEPTH TO WATER: 6.11'
WATER COLUMN: 8.68'
WELL DIAMETER: 2"
WELL VOLUME: x1.5gal
COMMENTS:

PURGE VOL. (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.
1.5	7.48	16.3	3.87	0.19	999	0.7
3.0	7.43	16.4	4.04	0.20	999	0.5
4.5	7.41	16.5	4.13	0.21	999	0.2
6.0	7.40	16.5	4.12	0.21	999	0.3

OBSERVATIONS: ☐ Froth ☐ Sheen ☐ Odor Type_____ ☐ Free Product Amount_____Type_____ ☐ Other

WELL: MW-10
DEPTH OF BORING: 13.30'
DEPTH TO WATER: 4.39'
WATER COLUMN: 8.91'
WELL DIAMETER: 2"
WELL VOLUME: ≈1.5gal
COMMENTS: Highly Silty

PURGE VOL. (Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.
1.5	7.47	15.1	2.85	0.13	691	1.4
3.0	~~8.51~~	15.0	2.06	0.09	999	1.6
4.5	7.49	15.0	2.08	0.08	999	1.5
6.0	7.48	15.1	2110	0.09	999	1.4

OBSERVATIONS: ☐ Froth ☐ Sheen ☐ Odor Type_____ ☐ Free Product Amount_____Type_____ ☐ Other

WELL:
DEPTH OF BORING:
DEPTH TO WATER:
WATER COLUMN:
WELL DIAMETER:
WELL VOLUME:
COMMENTS:

(Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	D.O.

OBSERVATIONS: ☐ Froth ☐ Sheen ☐ Odor Type_____ ☐ Free Product Amount_____Type_____ ☐ Other

CHROMALAB, INC.

Environmental Services (SDB)

March 4, 1998

Submission #: 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC
Project#: 95807
Received: February 25, 1998

re: 6 samples for TEPH analysis.
Method: EPA 8015M

Matrix: WATER
Sampled: February 23, 1998 *Run#:* 11392
Extracted: February 27, 1998
Analyzed: March 3, 1998

Spl#	CLIENT SPL ID	Kerosene (ug/L)	Diesel (ug/L)	Motor Oil (ug/L)
172572	MW-1	N.D.	N.D.	N.D.
	Note: Silica gel cleanup.			
172574	MW-5	N.D.	N.D.	N.D.
	Note: Silica gel cleanup.			

Matrix: WATER
Sampled: February 24, 1998 *Run#:* 11392
Extracted: February 27, 1998
Analyzed: March 2, 1998

Spl#	CLIENT SPL ID	Kerosene (ug/L)	Diesel (ug/L)	Motor Oil (ug/L)
172577	MW-8	N.D.	N.D.	N.D.
	Note: Silica gel cleanup.			
172579	MW-10	N.D.	N.D.	N.D.
	Note: Silica gel cleanup.			

Matrix: WATER
Sampled: February 24, 1998 *Run#:* 11392
Extracted: February 27, 1998
Analyzed: March 3, 1998

Spl#	CLIENT SPL ID	Kerosene (ug/L)	Diesel (ug/L)	Motor Oil (ug/L)
172575	MW-2	N.D.	N.D.	N.D.
	Note: Silica gel cleanup.			
172578	MW-9	N.D.	N.D.	N.D.
	Note: Silica gel cleanup.			
Reporting Limits		50	50	500
Blank Result		N.D.	N.D.	N.D.
Blank Spike Result (%)		--	101	--

Bruce Havlik
Chemist

Carolyn House
Chemist

CHROMALAB, INC.

Environmental Services (SDB)

March 6, 1998 *Submission #:* 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC *Project#:* 95807
Received: February 25, 1998

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/3050A/6010A Nov 1990*

Client Sample ID: **MW-2**
Spl#: 172575 *Matrix:* WATER *Extracted:* March 3, 1998
Sampled: February 24, 1998 *Run#:* 11459 *Analyzed:* March 5, 1998

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
LEAD	0.16	0.0050	N.D.	105	1

Christopher Arndt
Chemist

John S. Labash
Inorganics Supervisor

CHROMALAB, INC.

Environmental Services (SDB)

March 6, 1998 *Submission #:* 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC *Project#:* 95807
Received: February 25, 1998

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/3050A/6010A Nov 1990*

Client Sample ID: MW-7
Spl#: 172576 *Matrix:* WATER *Extracted:* March 3, 1998
Sampled: February 24, 1998 *Run#:* 11459 *Analyzed:* March 5, 1998

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
NICKEL	0.032	0.0050	N.D.	106	1

Christopher Arndt
Chemist

John S. Labash
Inorganics Supervisor

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Federal ID #68-0140157

CHROMALAB, INC.

Environmental Services (SDB)

March 3, 1998 *Submission #:* 9802404

DOVE ENGINEERING GROUP
Atten: Chris Palmer
Project: OAKLAND MSC *Project#:* 95807
Received: February 25, 1998
re: One sample for Fuel Oxygenates by GC/MS analysis.
Method: *EPA SW846 Method 8260 Modified*

Client Sample ID: **MW-8**
Spl#: 172577 *Matrix:* WATER
Sampled: February 24, 1998 *Run#:* 11426 *Analyzed:* February 27, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
TERTIARY BUTYL ALCOHOL (TBA)	N.D.	5.0	N.D.	--	1
METHYL TERTIARY BUTYL ETHER (MTBE)	N.D.	5.0	N.D.	94.7	1
DI-ISOPROPYL ETHER (DIPE)	N.D.	10	N.D.	--	1
ETHYL TERTIARY BUTYL ETHER (ETBE)	N.D.	5.0	N.D.	--	1
TERTIARY AMYL METHYL ETHER (TAME)	N.D.	5.0	N.D.	--	1

Note: *Recovery of 1,2-dichloroethane-d4 (surrogate) was outside of QC limit due to matrix interference.*

Michael Lee
Chemist

for Alex Newbar
Michael Verona
Operations Manager

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CHROMALAB, INC.

Environmental Services (SDB)

March 3, 1998 *Submission #:* 9802404

DOVE ENGINEERING GROUP
Atten: Chris Palmer
Project: OAKLAND MSC *Project#:* 95807
Received: February 25, 1998
re: One sample for Fuel Oxygenates by GC/MS analysis.
Method: *EPA SW846 Method 8260 Modified*

Client Sample ID: **MW-9**
Spl#: 172578 *Matrix:* WATER
Sampled: February 24, 1998 *Run#:* 11426 *Analyzed:* February 27, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
TERTIARY BUTYL ALCOHOL (TBA)	N.D.	5.0	N.D.	--	1
METHYL TERTIARY BUTYL ETHER (MTBE)	N.D.	5.0	N.D.	94.7	1
DI-ISOPROPYL ETHER (DIPE)	N.D.	10	N.D.	--	1
ETHYL TERTIARY BUTYL ETHER (ETBE)	N.D.	5.0	N.D.	--	1
TERTIARY AMYL METHYL ETHER (TAME)	N.D.	5.0	N.D.	--	1

Michael Lee
Chemist

for Oleg Newborn
Michael Verona
Operations Manager

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CHROMALAB, INC.

Environmental Services (SDB)

March 3, 1998 *Submission #:* 9802404

DOVE ENGINEERING GROUP
Atten: Chris Palmer
Project: OAKLAND MSC *Project#:* 95807
Received: February 25, 1998
re: One sample for Fuel Oxygenates by GC/MS analysis.
Method: *EPA SW846 Method 8260 Modified*

Client Sample ID: **MW-10**
Spl#: 172579 *Matrix:* WATER
Sampled: February 24, 1998 *Run#:* 11427 *Analyzed:* March 2, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
TERTIARY BUTYL ALCOHOL (TBA)	N.D.	5.0	N.D.	--	1
METHYL TERTIARY BUTYL ETHER (MTBE)	N.D.	5.0	N.D.	104	1
DI-ISOPROPYL ETHER (DIPE)	N.D.	10	N.D.	--	1
ETHYL TERTIARY BUTYL ETHER (ETBE)	N.D.	5.0	N.D.	--	1
TERTIARY AMYL METHYL ETHER (TAME)	N.D.	5.0	N.D.	--	1

Michael Lee
Chemist

for Olley Nevarez
Michael Verona
Operations Manager

CHROMALAB, INC.

Environmental Services (SDB)

March 4, 1998

Submission #: 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC
Project#: 95807
Received: February 25, 1998

re: One sample for Gasoline BTEX analysis.
Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-1
Spl#: 172572
Matrix: WATER
Run#:11476
Sampled: February 23, 1998
Analyzed: February 27, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	820	50	N.D.	106	1
BENZENE	160	0.50	N.D.	101	1
TOLUENE	4.9	0.50	N.D.	101	1
ETHYL BENZENE	3.0	0.50	N.D.	96	1
XYLENES	9.7	0.50	N.D.	96	1

Vincent Vancil
Chemist

Michael Verona
Operations Manager

553-9230

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CHROMALAB, INC.

Environmental Services (SDB)

March 4, 1998

Submission #: 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC
Project#: 95807
Received: February 25, 1998

re: One sample for BTEX analysis.
Method: SW846 8020A Nov 1990

Client Sample ID: MW-2
Spl#: 172575
Sampled: February 24, 1998
Matrix: WATER
*Run#:*11382
Analyzed: February 26, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
BENZENE	1.6	0.50	N.D.	98	1
TOLUENE	N.D.	0.50	N.D.	99	1
ETHYL BENZENE	N.D.	0.50	N.D.	94	1
XYLENES	N.D.	0.50	N.D.	95	1

Vincent Vancil
Chemist

Michael Verona
Operations Manager

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CHROMALAB, INC.

Environmental Services (SDB)

March 4, 1998 *Submission #:* 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC *Project#:* 95807
Received: February 25, 1998

re: One sample for Gasoline BTEX analysis.
Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-5
Spl#: 172574 Matrix: WATER
Sampled: February 23, 1998 *Run#:*11476 *Analyzed:* February 27, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	740	50	N.D.	106	1
BENZENE	19	0.50	N.D.	101	1
TOLUENE	1.4	0.50	N.D.	101	1
ETHYL BENZENE	41	0.50	N.D.	96	1
XYLENES	34	0.50	N.D.	96	1

Vincent Vancil
Chemist

Michael Verona
Operations Manager

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CHROMALAB, INC.

Environmental Services (SDB)

March 4, 1998 Submission #: 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC Project#: 95807
Received: February 25, 1998

re: One sample for Gasoline BTEX analysis.
Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-8
Spl#: 172577 Matrix: WATER
Sampled: February 24, 1998 Run#:11382 Analyzed: February 26, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	N.D.	50	N.D.	104	1
BENZENE	N.D.	0.50	N.D.	98	1
TOLUENE	N.D.	0.50	N.D.	99	1
ETHYL BENZENE	N.D.	0.50	N.D.	94	1
XYLENES	N.D.	0.50	N.D.	95	1

Vincent Vancil
Chemist

Michael Verona
Operations Manager

553-9230

FM ...O:BTEXQC0220

CHROMALAB, INC.

Environmental Services (SDB)

March 4, 1998

Submission #: 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC
Project#: 95807
Received: February 25, 1998

re: One sample for Gasoline BTEX analysis.
Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-9
Spl#: 172578
Matrix: WATER
Sampled: February 24, 1998
*Run#:*11382
Analyzed: February 26, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
TOLUENE	5.6	0.50	N.D.	99	1
ETHYL BENZENE	1.6	0.50	N.D.	94	1
XYLENES	4.9	0.50	N.D.	95	1
GASOLINE	2200	1000	N.D.	104	20
BENZENE	540	10	N.D.	98	20

Vincent Vancil
Chemist

Michael Verona
Operations Manager

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CHROMALAB, INC.

Environmental Services (SDB)

March 4, 1998

Submission #: 9802404

DOVE ENGINEERING GROUP

Atten: Chris Palmer

Project: OAKLAND MSC
Received: February 25, 1998

Project#: 95807

re: One sample for Gasoline BTEX analysis.
Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: **MW-10**
Spl#: 172579
Sampled: February 24, 1998

Matrix: WATER
Run#:11382

Analyzed: February 26, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	N.D.	50	N.D.	104	1
BENZENE	N.D.	0.50	N.D.	98	1
TOLUENE	N.D.	0.50	N.D.	99	1
ETHYL BENZENE	N.D.	0.50	N.D.	94	1
XYLENES	N.D.	0.50	N.D.	95	1

Vincent Vancil
Chemist

Michael Verona
Operations Manager

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CHROMALAB, INC.

Environmental Services (SDB) (DOHS 1094)

1220 Quarry Lane • Pleasanton, California 94566-4756
510/484-1919 • Facsimile 510/484-1096

Chain of Custody

DATE 2/24/98 PAGE 1 OF 1

PROJ MGR Chris Palmer
COMPANY DOVE Engineering, Inc
ADDRESS 7677 Oakport Drive #105
Oakland CA 94621

SAMPLERS (SIGNATURE) for ACC
Ely L

(PHONE NO.) (510) 553-7036
(FAX NO.) (510) 553-7005

ANALYSIS REPORT

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/BTEX (EPA 602, 8020)	TPH - Diesel (TEPH) (EPA 3510/3550, 8015)	PURGEABLE AROMATICS 8TEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520, B+F, E-F)	PCB (EPA 608, 8080)	PESTICIDES (EPA 608, 8080)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	FUEL OXYGENATES By EPA 8260	LUFT METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	TOTAL LEAD	EXTRACTION (TCLP, STLC)	Nickel	SILICA GEL CLEANUP EPA 3630M	NUMBER OF CONTAINERS
MW-1	2/23/98	13:18	H2O	HCl/HNO3/COLD		X	X																X	4
MW-2	2/24/98	9:40	H2O	HCl/HNO3/COLD		X	X	X															X	4
MW-5	2/23/98	12:30	H2O	HCl/COLD		X	X																X	4
MW-6						X	X										X					X	X	5
MW-7	2/24/98	10:45	H2O	HNO3																		X		1
MW-8	2/24/98	12:30	H2O	HCl/COLD		X	X										X						X	5
MW-9	2/24/98	13:15	H2O	HCl/COLD		X	X										X						X	5
MW-10	2/24/98	14:10	H2O	HCl/COLD		X	X										X						X	5

PROJECT INFORMATION

PROJECT NAME Oakland MSC
PROJECT NUMBER 95807
P.O.# 95807-7

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS	28
HEAD SPACE	
REC'D GOOD CONDITION/COLD	
CONFORMS TO RECORD	

TAT: STANDARD 5-DAY | | | 24 | 48 | 72 | OTHER

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY 1.
Ely L (SIGNATURE) 1:52 (TIME)
Ely Linares 2:25:98 (PRINTED NAME) (DATE)
ACC Environmental (COMPANY)

RECEIVED BY 1.
(SIGNATURE) 1538 (TIME)
(PRINTED NAME) 2:28:98 (DATE)
(COMPANY)

RELINQUISHED BY 2.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY 2.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RELINQUISHED BY
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY (LABORATORY)
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(LAB)